

List of available health models, and models that can be easily implemented. This list is meant to give an impression and is not complete.

In silico

NIZO food research has an in silico model to calculate the effects of nutrition on gastrointestinal survival and colonization of Salmonella or ETEC. NIZO food research also possesses an in silico model to calculate the gastrointestinal survival and colonization of probiotics. This model can also be used to calculate the effect of prebiotics on probiotic survival and colonization.

In vitro

Subject	Available	Knowledge to implement easily
Simulation digestion (SimPhyd)	Incubation under in vitro gastrointestinal conditions with no or limited feedback (e.g. constant pH) Nutrient stability (e.g. encapsulation)	Extension in vitro model with colonic fermentation
Survival probiotics	Acid, bile, and fatty acid resistance	
Functionality probiotics	White blood cell stimulation assays, antimicrobial activity, gene expression, phenotype characterization of strains	
Functionality prebiotics	Fermentation profiles	
Functionality bioactive peptides	ACE-inhibition, antimicrobial, immune modulation	
Functionality antioxidants	TEAC, LDL-oxidation	Radical scavenging activity, reducing power, metal-chelating activity
Allergy (cow milk)	Allergen detection of cow milk proteins in hypoallergenic products	Other allergens



In vivo models

Subject	Available	Knowledge to implement easily
Gastrointestinal		
Gastrointestinal resistance	Salmonella, ETEC (traveller's diarrhoea), listeria, helicobacter, antibiotic-induced diarrhoea	Viral infections (e.g. rotavirus), other bacterial pathogens (e.g. vibrio), yeast infections, helminthia.
Anti-inflammation	Colitis models (DSS, TNBS, HLA, indomethacin)	Gastritis models (e.g. aspirin)
Immune modulation	Vaccination. LPS challenge. Ex vivo stimulation of spleen or white blood cells (Combination with above-mentioned models)	Allergy or auto-immune diseases.
Barrier function	Determined with Cr-EDTA	Lactulose/mannitol etc. Allergen permeation
Proliferation & differentiation/ Colon cancer	<i>In vivo</i> proliferation and apoptosis markers exhibited to e.g. heme or high fat diets	Maturation gastrointestinal tract <i>In vivo</i> models with colon cancer as end point (tumor incidence or frequency in colon)
Microflora	Composition microflora (classical culturing and molecular). Functionality in combination with above-mentioned models	
Probiotics	Survival gastrointestinal tract. Functionality in combination with above-mentioned models	
Bioavailability	Mineral absorption (mineral balance, blood levels and functionality). Bioavailability and functionality of antioxidants: TEAC, LDL oxidation, oxidative liver damage (carbon tetrachloride, paracetamol, alcohol)	Polyphenolic antioxidants and their metabolites in blood/urine (LC-MS) Specific <i>in vivo</i> models (hyperabsorption and hypoabsorption)
Nutrigenomics	Gastrointestinal gene expression using microarrays en RT-QPCR. Combination with above-mentioned models.	Vitamins
Pulmonary infections	Influenza infection	
Weight management	Satiety hormones: levels in blood and gene expression in organs. Energy intake, body weight, % visceral fat	
Overig		
Blood pressure		Continuous blood pressure registration
Protein quality	PER value, digestibility biological value, net protein utilization etc.	

Human trials

Subject	Available	Knowledge to implement easily
Adults		
Gastrointestinal resistance	Traveller's diarrhoea with an attenuated ETEC strain	Other attenuated strains
Barrier function	Measured with Cr-EDTA	Lactulose/mannitol etc. Allergen permeation
Probiotics	Colonization, Survival gastrointestinal tract.	Vaccination trials
Oral Health	Breath quality, microflora	
Satiation/Satiety	Satiation/satiety with VAS scale and food intake	Satiety hormones
Bioavailability	Minerals (feces, urine and blood levels) Glutathione in blood	Polyphenolic antioxidants and their metabolites in blood/urine (LC-MS) Vitamins
Cholesterol	Blood lipids (HDL/LDL/triglycerides etc). LDL oxidation	
Babys		
Microflora	Composition of microflora (classical culturing or molecular biology technics)	Metagenomics

It should be noted that for various ingredients with specific activities specialized test can easily be developed.

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